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Keeping mistakes from computers

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Engineer Tore Wilk, who helped form Addo's programming philosophy, holds card that "edits" data from adding machine before it goes to paper tape puncher.

Addo, the Swedish adding machine maker, is punching out a new market with the data processing equipment pictured at left. This complex package of mechanical and electrical hardware performs a seemingly simple job: It punches error-free paper tape that can be read by any electronic computer.

Error-free, or "clean," data input is a must for electronic data processing, and Addo has set out to purify the figures at the source by use of a special program card (held by bearded Addo engineer Tore Wilk) that is inserted in the paper tape punch.

Although experienced key punch operators allow almost no errors to enter a computer, when mistakes do get in, they are difficult and costly to track down. The function of the Addo equipment is to prevent a wrong sequence or combination of numbers from getting into the computer in the first place.

Initial steps. Addo began going down this line of development 10 years ago when it worked on a computer called Alwak with Swedish financier and industrialist Axel-Wenner-Gren. The Alwak project was dropped because of high development costs, but Addo did gain a wealth of experience with data input devices.

Managing Director Gunnar Agrell figured that the company might enhance its future by combining data input with one of Addo's basic products, the 10-key adding machine. He concluded that adding machines, used in retailing, banks, and small offices, could be hooked up to punch computer paper tape simultaneously with their normal accounting duties. Then the tape could be mailed to a computer center, or transmitted by wire. The end result would give businessmen all the advantages of using a computer without the expense of a full-blown computer operation.

Heart of the concept is the program card. These can be changed quickly to switch the punch from billing to payroll to inventory or anything else. They automatically block, for example, in preparation of



Gunnar Agrell, Addo's managing director, saw need for error-free data.



George Agrell heads U.S. operation, sees biggest potential here.

retail sales totals, in correct sequence of stores and amounts. Addo salesmen can prepare these cards for customers, or with a little training, the user can do it himself.

Acceptance. The whole idea has appealed to a wide range of European businesses. Addo 10-key adding machines and its paper tape punches are being used for such tasks as writing up bakery orders, cutting steel plate in a shipyard in Addo's hometown of Malmö, and handling the Belgian and Swedish postal payments system. Last month, Addo won a \$500,000 order for equipment from Svenska Handelsbanken, Scandinavia's largest bank.

Although it has been on the U.S. data processing market for less than a year, the Addo-X (the X stands for the 10 keys in the adding machine and is used as the name of the American company) has won orders from such retailers as Bonwit Teller, Rich's of Atlanta, and the 11-store Weiss Bros. Stores, Inc., chain in the South. Installations are being tested by one state government, a large insurance company, a group of savings banks, and a nationwide wood products concern.

The Swedish company feels that the U.S. will be its chief outlet for data processing equipment in two years, and its first U.S.-designed product is ready for market, according to Lyster T. Carney, Jr. He heads Addo's U.S. data processing sales and was lured away from International Business Machines Corp.

Keeping time. The new device adapts the basic paper tape punch idea to a factory recording device that replaces a time clock. Instead of using a timecard, employees insert a molded plastic key into a console. In less than a second, each key records on paper tape the employee's number along with time of entry or departure. The tape then can be used in conjunction with a computer to prepare payroll checks.

The recording device is "idiot proof"; employees can't punch in or out on another's timecard. While the time clock device will be made in the U.S., the punch section will come from Sweden.

The Addo name is nothing new in the U.S. George Agrell, brother of Gunnar, heads the operation here, and the company has been selling calculators and adding machines in the U.S. since the 1920s.

While it doesn't begin to compare with National Cash Register or the Monroe division of Litton Industries in size, it is growing nicely. In 1960, total world sales amounted to \$12-million, of which \$500,000 represented data processing equipment.

Last year, sales amounted to \$23-million, and data processing equipment accounted for \$3-million. In the U.S., Addo-X now has 28 sales and service centers for data processing equipment.

No mistakes. It is symbolic, too, that Addo's efforts in data processing have been concentrated in eliminating mistakes. Back in Sweden, Addo has almost a fixation on quality control in its determination to produce reliable machines. Of some 1,600 employees, about 300 work strictly on quality control. Every part of an Addo machine is tested or measured before going to the assembly line.

"When you have something like 4,000 parts in a machine and any one of them can cause trouble, you have to take care from the very start," comments an Addo executive.

Even after assembly, adding machines are tested by a robot device. Levers actuated by an electromagnetic system punch out a variety of operations on keyboards and results are registered on tape; this makes it easy to spot flaws almost immediately. Manual tests, too, are run on all machines.

Responsibility. Like workers in most Swedish industry, Addo production people are paid on a piecework basis. A detailed production record accompanies each machine through the factory, from start to final test. If a machine is found to be faulty during the final testing, it goes back to the shop. Then the workers responsible for the error correct the fault on their own time, which cuts into piece-rate payments. Although the system seems complex, Addo says it works well and achieves the primary aim: turning out machines with as few rejects as possible.

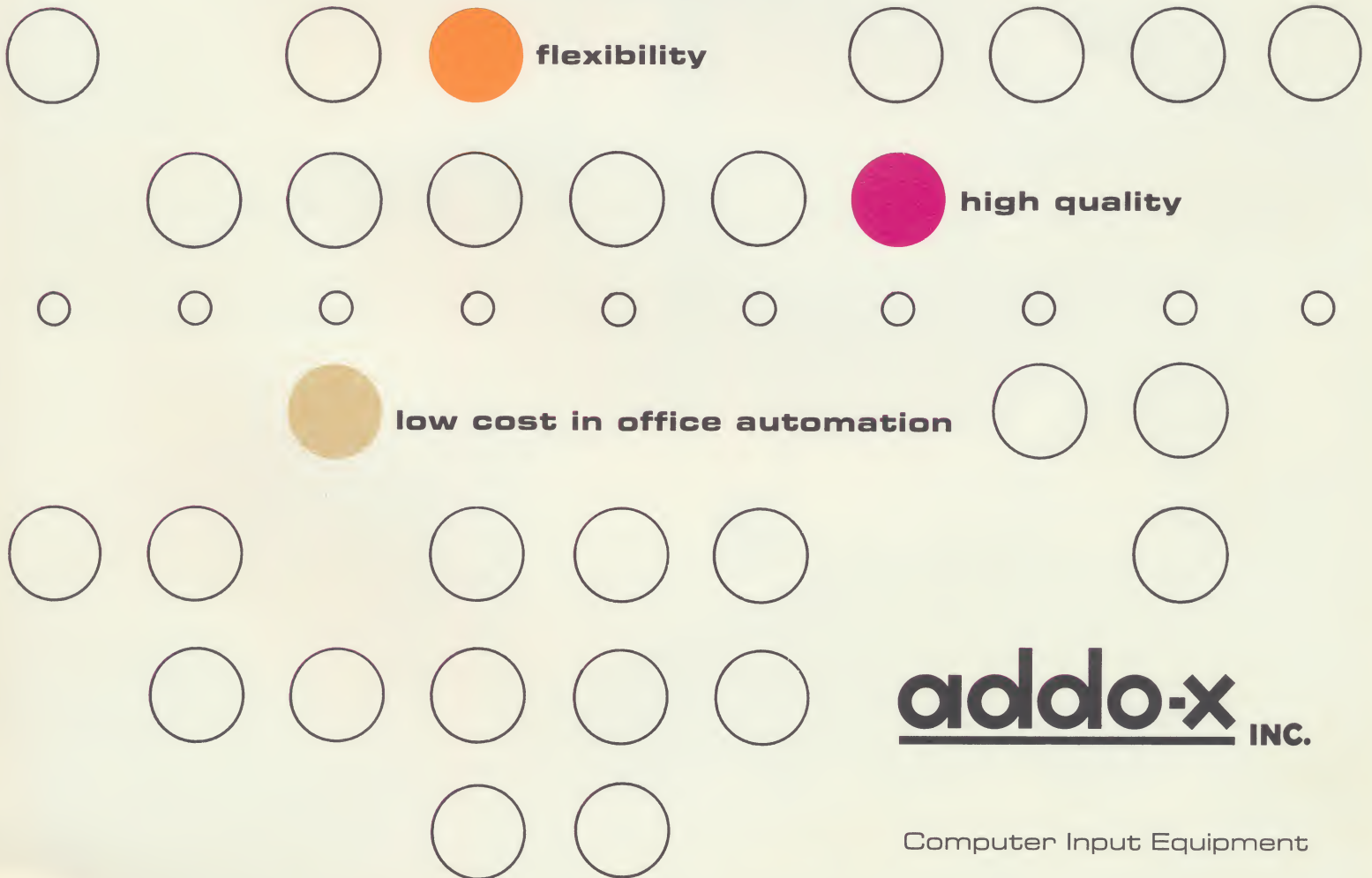
In fact, Addo actually was founded as the result of making a better product. Its founder was Hugo Agrell, father of Gunnar and George. He was an importer of American adding machines, and his supplies were cut off during World War I.

When his stock was narrowed down to a single machine, he showed it to a relative who was a mechanical engineer. The relative examined the machine closely and said he could make a better one. He did, and the machine, as well as the company, was named Addo, Latin for "I add."

Addo produced its first key machine in 1924 and its classic 10-key model in 1936. From this Addo-X model has grown a range of adding, accounting, and bookkeeping machines, and office equipment. Addo also sells the Royal typewriter in Sweden.

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addoflex data processing



addo-x INC.

Computer Input Equipment

Addoflex Data Processing Computer Input Equipment



Addo-X Tape Punch

What the Addo-X Tape Punch does

The Addo-X Tape Punch is available in 5, 6, 7 and 8 channel capacities, with codes easily interchangeable by means of a diode-matrix quickly detachable by loosening one screw. The Addo-X Tape Punch is programmable for up to 35 steps by means of a plastic Program Card 24 columns wide. Holes punched in the Addo-X Program Card will serve the following purposes:

- Determine the field capacity in each step (unless the punch is set to constant field limit).
- Select the correct program step and safeguard against operator selection of incorrect function key on Base Machine. (If the machine function selected by the operator fails to corre-

spond to the function indicated on the Addo-X Program Card, the machine locks up, calling immediate attention to the error.)

- Duplicate on the tape any code-configuration appearing on the Program Card. (For example: "PI" code, "end of line" code, "stop feed" code,

"new item" code, "card feed" code, and so on.)

Several different Addo-X Program Cards can be used with the same Addo-X Tape Punch, each card serving a different application. Similarly, the same Program Card can be used with different tape punches, in case of job-switching between departments or machine down-time.

The Addo-X Tape Punch is equipped with 8 push-buttons which provide for easy operation, maneuvering of Program Card, error indication, erasure of incorrect punches and for tape feed.

The Addo-X Tape Punch is assembled in major sections, mechanically and electrically, for rapid service which reduces down-time to a minimum.



Addo-X Shuttle Carriage Adding Machine

Punched Tape - What's in it for you?

Whether your tape is fed into your own computer or sent to a service bureau for extraction of data, punched tape holds these advantages over the conventional punched card:

- Tape is more economical than cards. Even if each tab-card is filled to capacity with data (80 columns) cards cost you three times as much as tape. In the more likely event that tab-cards are half filled, they cost six times as much as tape.
- Tape is much easier and safer to transport and transmit than are cards. Single cards can easily disappear. Stacks of cards are much bulkier than a compact strip of punched tape.
- Tape saves computer time, for it feeds rapidly in a continuous stream. Cards must be handled one by one in an intermittent motion.
- Tape is technically safer than cards. A card jam-up at the computer read station may cause considerable down-time and card reconditioning. The same applies to cards damaged by human handling. Tape, however, can easily be straightened out in the feeding device itself.
- Cards in storage consume far more space than does tape.

For long-distance transmission of data, Addoflex-produced punched tape is in many instances most economical and practical. The ability of Addo-X equip-

ment to generate "hash" totals at any time and with any frequency provides a simple means of verifying transmitted data.

Why the Addo-X Tape Punch?

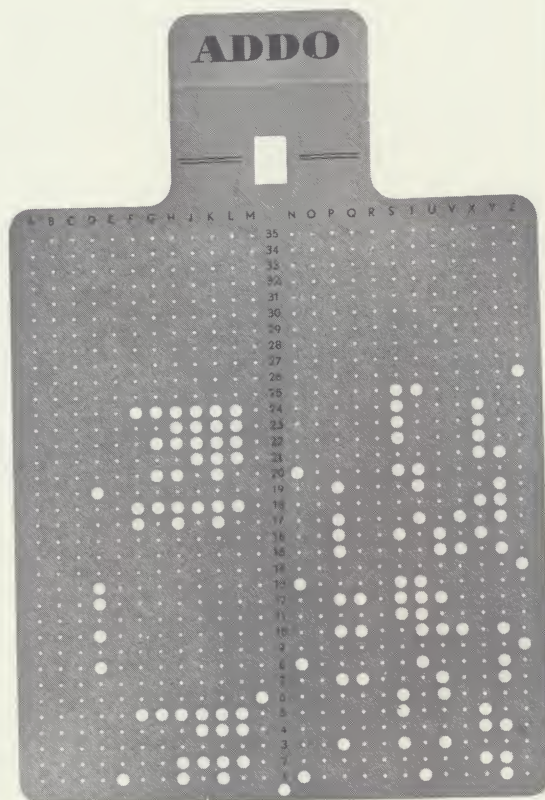
The Addo-X Tape Punch has many advantages over other types of tape punches. Here are a few important plusses:

- The programming versatility of the exclusive Addo-X Program Card is greater than that of any other tape punch. The Program Card assures *automatic* field control, *automatic* blocking in case of operator error and *automatic* function code punching.



Addo-X Step-o-matic Adding Machine

- The Addo-X Tape Punch works interchangeably with 5, 6, 7 and 8 channel systems. Switching from one to another is a mere matter of seconds.
- The Addo-X Tape Punch offers real operating flexibility. It can be linked to a variety of adding and accounting machines which offer variety in carriage widths and automatic features. Since Tape Punch connection is as simple and quick as plugging in a lamp, interchanging Base Machines is a rapid operation. The Addo-X Tape Punch-connected Base Machine can even be linked with a key punch for tab-card punching where such installations function in parallel with tape fed computer systems.

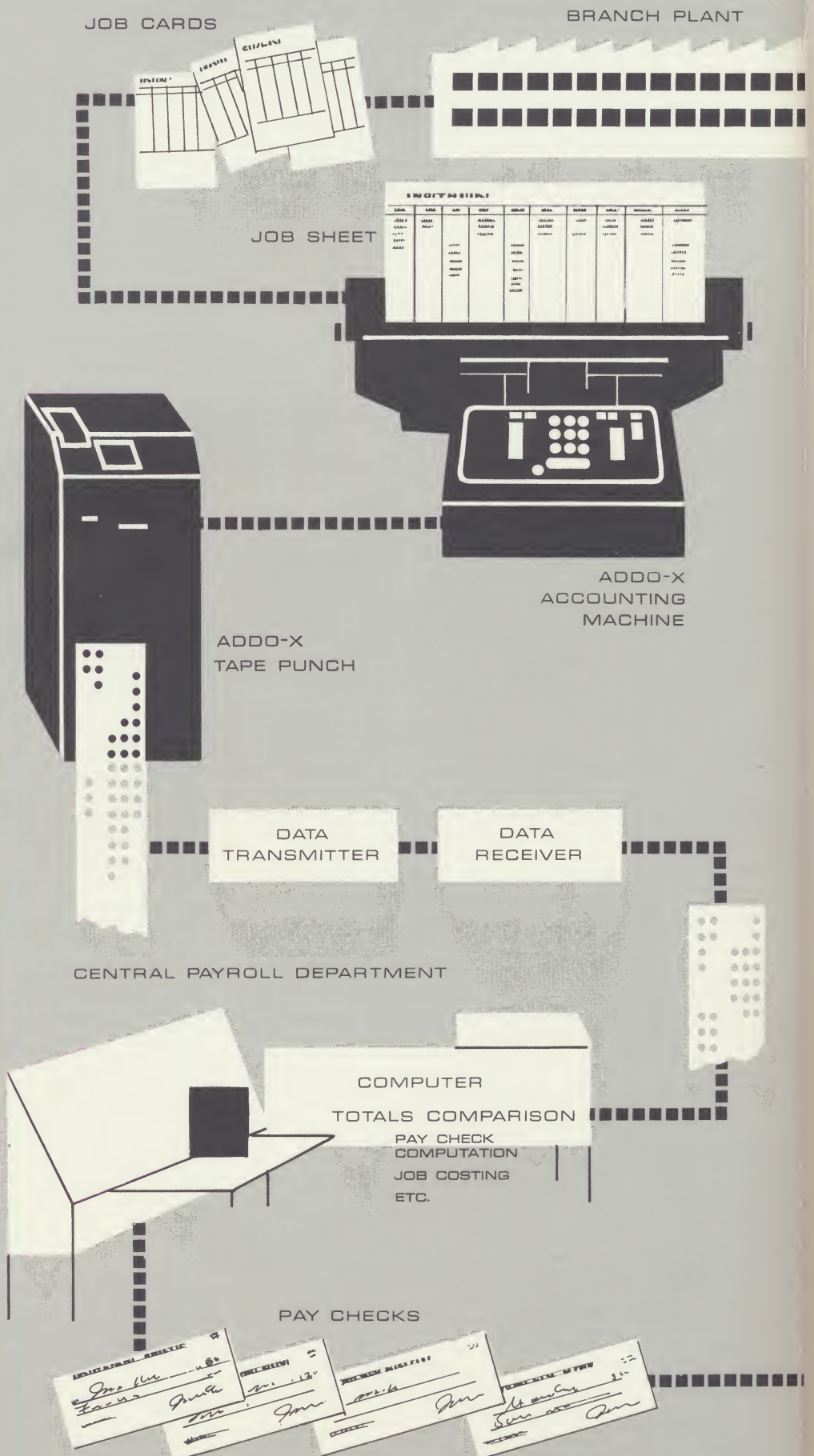


Addo-X plastic Program Card



Addo-X fully automatic Accounting Machine

Preparation of Payroll for Decentralized Organizations



Addoflex Data Processing Computer Input Equipment



Addo-X Tape Punch

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